

1. A metal halide lamp having superior red rendering characteristics, said lamp comprising:  
an arc tube formed of a material transmissive to visible radiation; and

5 a fill of metal halides in said vessel, said fill comprising at least one member selected from the group consisting of  $\text{CaI}_2$ ,  $\text{CaBr}_2$  plus at least one member selected from the group consisting of  $\text{AlI}_3$ ,  $\text{AlBr}_3$ ,  $\text{GaI}_3$ ,  $\text{GaBr}_3$  plus at least one member selected from the group consisting of  $\text{TlI}$  and  $\text{TlBr}$ ; and  
10 discharge electrodes disposed at opposite ends within said arc tube.

2. The lamp as claimed in claim 1 wherein the fill further comprises mercury and either Ar or Xe; and

15 wherein the  $\text{CaI}_2$  or  $\text{CaBr}_2$  or both are in a molar quantity between about 10 and 75% of the total molar quantity of the total halides; and

20 wherein the  $\text{AlI}_3$  or  $\text{AlBr}_3$  or both are in a molar quantity between about 2 and 50% of the total molar quantity of the total halides; and

25 wherein the  $\text{TlI}$  or  $\text{TlBr}$  or both are in a molar quantity between about 5 and 50% of the total molar quantity of the total halides.

3. The lamp as claimed in claim 1 wherein said fill further comprises mercury plus either Ar or Xe

plus halides of at least one of the elements of Dy, Ho, Tm, Na, Li, Cs; and

wherein the  $\text{CaI}_2$  or  $\text{CaBr}_2$  or both are in a molar quantity between about 10 and 75% of the total molar quantity of the total halides; and

wherein the  $\text{AlI}_3$  or  $\text{AlBr}_3$  or both are in a molar quantity between about 2 and 50% of the total molar quantity of the total halides; and

wherein  $\text{TlI}$  or  $\text{TlBr}$  or both are in a molar quantity between about 5 and 50% of the total molar quantity of the total halides.

4. The lamp according to claim 1 wherein the arc tube is either polycrystalline alumina, sapphire or quartz.

5. The lamp according to claim 1 wherein the arc tube is surrounded by a glass envelope.

6. The lamp according to claim 5 wherein said envelope contains a fill gas of nitrogen at a pressure between about 250 and 600 torr.

7. The lamp according to claim 1 wherein the arc tube is surrounded by a shroud.

8. The lamp according to claim 7 wherein the shroud is made of quartz or borosilicate glass.

9. The lamp according to claim 7 wherein the shroud is of cylindrical shape.

5 10. The lamp according to claim 7 wherein a glass shroud enclosing the arc tube is used as a narrow band filter to reduce radiation at about 585nm with a half peak bandwidth of between about 5 and 40nm.

10 11. The lamp according to claim 10 wherein said glass shroud consists of high silica borosilicate glass doped with appropriate amounts of Nd to achieve said filtering effect.

15 12. An arc tube according to claim 2 wherein the fill is sodium-free.

20 13. A metal halide lamp having superior red rendering characteristics, said lamp comprising:  
an arc tube formed of a material transmissive to visible radiation, said material being either polycrystalline alumina, sapphire or quartz; and  
a fill of metal halides in said vessel, said fill comprising at least one member selected from the group consisting of  $\text{CaI}_2$ ,  $\text{CaBr}_2$  plus at least one member selected from the group consisting of  $\text{AlI}_3$ ,  $\text{AlBr}_3$ ,  $\text{GaI}_3$ ,  $\text{GaBr}_3$  plus at least one member selected from the group consisting of  $\text{TlI}$  and  $\text{TlBr}$ ; and  
said fill further comprising mercury and either Ar or Xe; and

wherein the  $\text{CaI}_2$  or  $\text{CaBr}_2$  or both are in a molar quantity between about 10 and 75% of the total molar quantity of the total halides; and

wherein the  $\text{AlI}_3$  or  $\text{AlBr}_3$  or both are in a molar quantity between about 2 and 50% of the total molar quantity of the total halides; and

wherein the  $\text{TlI}$  or  $\text{TlBr}$  or both are in a molar quantity between about 5 and 50% of the total molar quantity of the total halides; and

wherein said fill further comprises at least one of the elements of Dy, Ho, Tm, Na, Li, Cs; and discharge electrodes disposed at opposite ends within said arc tube.